APPROACH TO THE MANAGEMENT OF ACUTE PERIOPERATIVE AND POSTOPERATIVE PAIN

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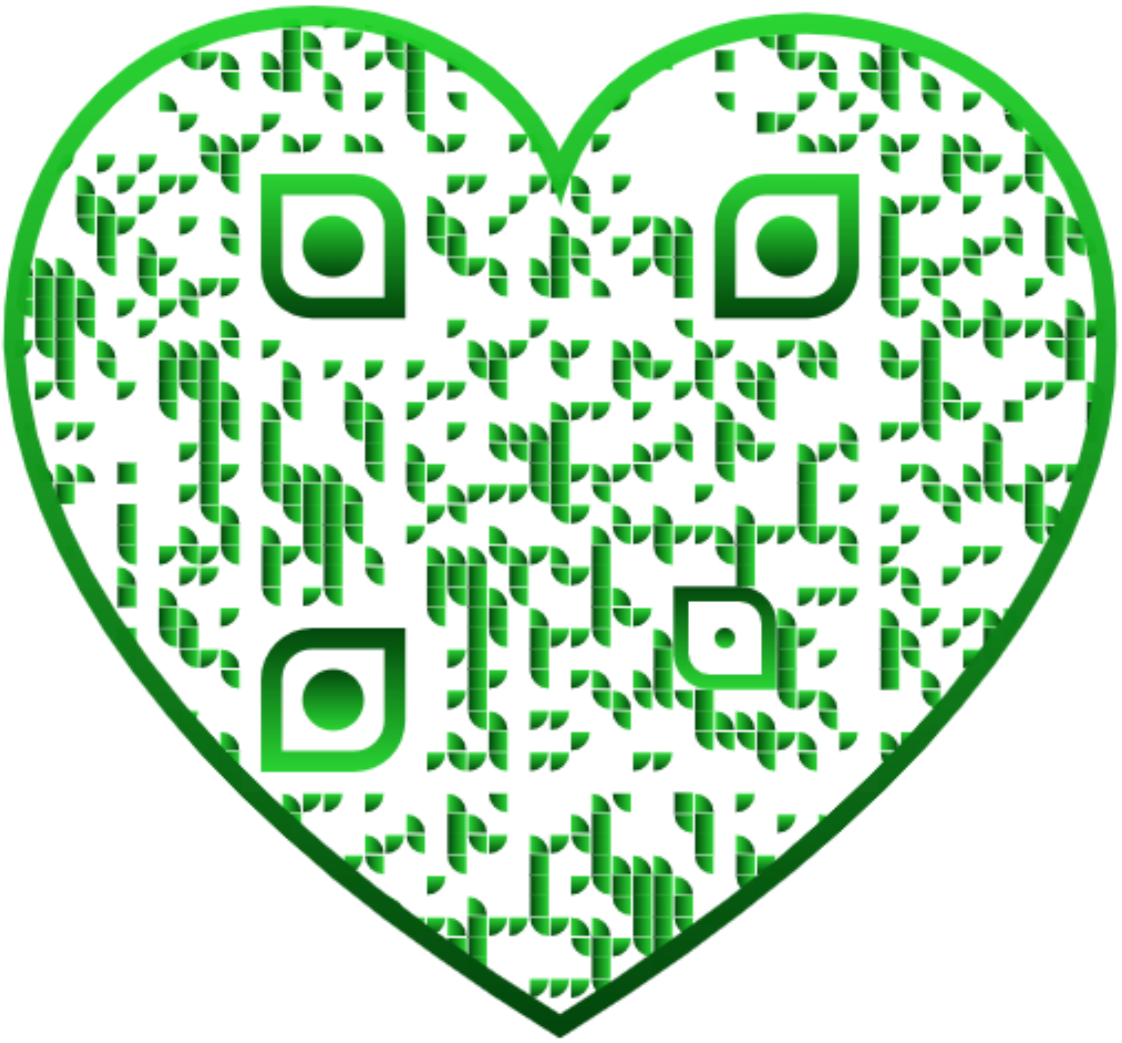


WHAT IS PAIN ?

DEFINITION OF PAIN

An Unpleasant Sensory and Emotional Experience Associated with Actual or Potential Tissue Damage, or Described in Terms of Such Damage .

ACUTE PAIN

- Pain in Perioperative Setting
- Pain in Patients with Severe or Concurrent Medical Illnesses (Pancreatitis)
- Acute Pain Related to Cancer or Cancer Treatment

MECHANISM OF PERIOPERATIVE PAIN

Pain pathways

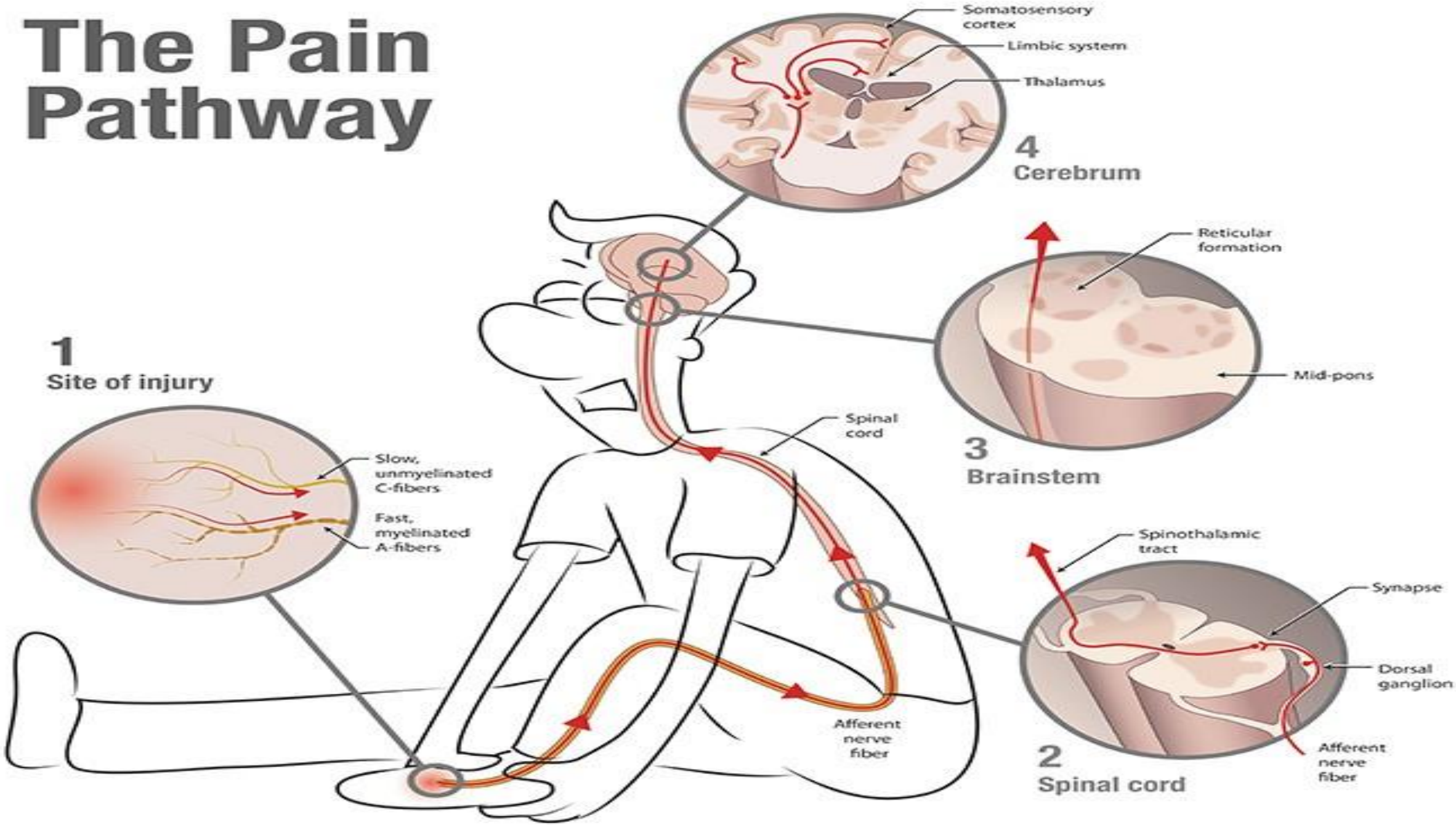
Withdrawal reflex

Pain sensitization

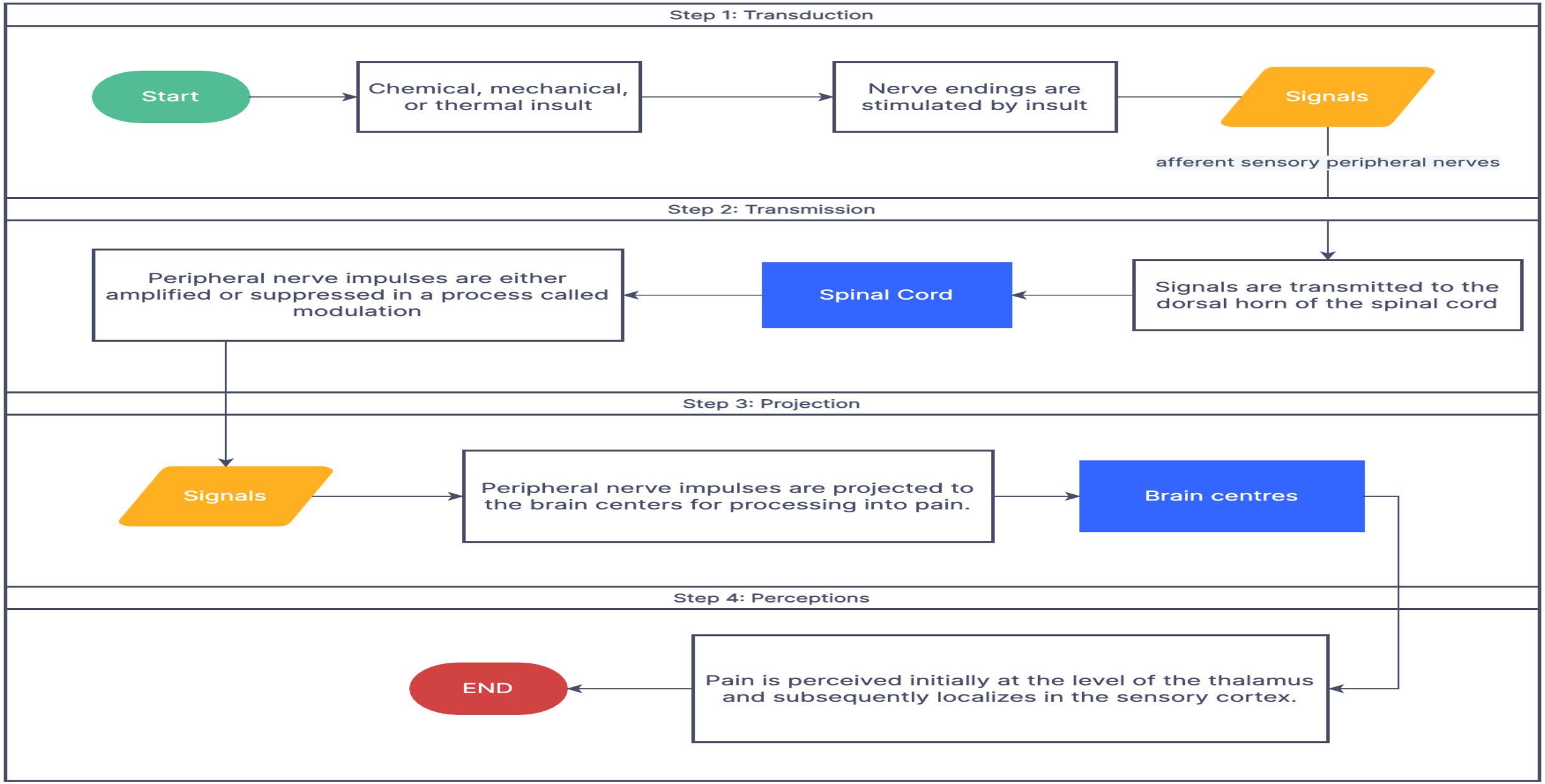
Peripheral sensation

Central sensation

The Pain Pathway



Pain Pathway Flowchart


Step 1: Transduction
Start
Chemical, mechanical, or thermal insult
Nerve endings are stimulated by insult
Signals
afferent sensory peripheral nerves
Step 2: Transmission
Signals are transmitted to the dorsal horn of the spinal cord
Spinal Cord
Peripheral nerve impulses are either amplified or suppressed in a process called modulation
Step 3: Projection
Signals
Peripheral nerve impulses are projected to the brain centers for processing into pain.
Brain centres
Step 4: Perceptions
Pain is perceived initially at the level of the thalamus and subsequently localizes in the sensory cortex.
END

GENERAL APPROACH

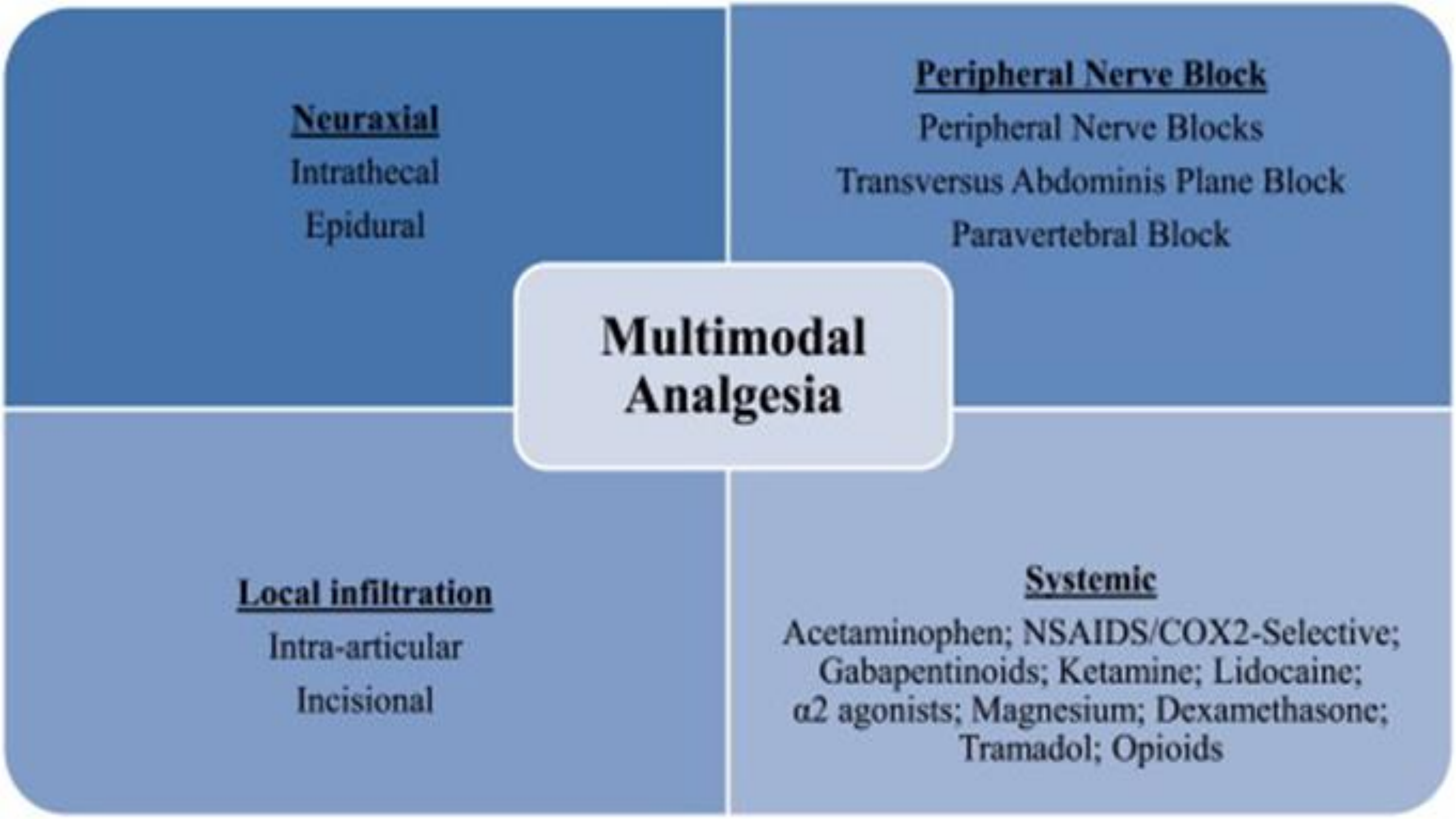
Goals and principles for acute pain management

- To relieve suffering,
- To Facilitate function,
- To Enhance recovery After surgery,
- To achieve early postoperative mobilization and reduce length of hospital stay

PRINCIPLES:

A - Use of multimodal analgesia

- The simplest definition of multimodal analgesia is the use of two or more agents that employ different mechanisms for pain management
- The suggestion of use of a multimodal approach to analgesia for acute pain, rather than the use of opioids alone
- a number of studies of various patient populations have found that the use of multimodal analgesia may improve pain management, reduce opioid consumption, and reduce opioid related side effects


Neuraxial
Intrathecal
Epidural
Peripheral Nerve Block
Peripheral Nerve Blocks
Transversus Abdominis Plane Block
Paravertebral Block
Multimodal Analgesia
Local infiltration
Intra-articular
Incisional
Systemic
Acetaminophen; NSAIDS/COX2-Selective; Gabapentinoids; Ketamine; Lidocaine; α2 agonists; Magnesium; Dexamethasone; Tramadol; Opioids

B- Minimize opioids

- Opioids are associated with short-term side effects (ie, respiratory depression, excessive sedation, nausea and vomiting, pruritus, urinary retention, constipation) that negatively impact recovery,
- long-term adverse effects (ie, tolerance, dependence, opioid induced hyperalgesia or withdrawal upon conclusion of therapy), and possible misuse

CREATING A PLAN FOR ANALGESIA

- The initial plan for analgesia should be based on patient factors and the predicted or existing degree of pain.
- The degree of pain cannot be precisely predicted.
- Thus, patients must be monitored for pain and for treatment side effects, and management should be adjusted accordingly

- PATIENT EVALUATION

- Patient evaluation should include assessment of baseline medical and psychological conditions, substance use disorder, pain treatment history, and long-term medications, all of which may affect the plan for analgesia.

- **Examples** of the implications of issues that may be identified include the following:
- Some conditions make regional anesthesia techniques difficult to perform (eg, obesity, ankylosing spondylitis, prior spine surgery).
- Neuraxial block and deep peripheral nerve blocks may be contraindicated in the patients with abnormal coagulation or platelet dysfunction
- Patients who chronically use opioids may require complex multimodal plans for perioperative pain control.
- Older patients and patients with obstructive sleep apnea (OSA) may be more prone to the side effects of sedatives and opioids, requiring either dose modification or avoidance of these medications

RISK FACTORS FOR GREATER INTENSITY AND DURATION OF ACUTE PAIN

- Both patient factors and the type of planned surgery may predict the need for enhanced or specialized acute or postoperative pain management:
- Patient factors that have been associated with poor postoperative pain control include younger age, female sex, active smoking, depression and anxiety, pain catastrophizing, history of substance use disorder, obesity, and existence of preoperative pain at baseline
- Certain surgical procedures (eg, knee arthroplasty) may also have a longer duration of moderate to severe postoperative pain than others

EARLY PREOPERATIVE EVALUATION FOR SOME PATIENTS

- For most patients without complex needs for postoperative analgesia, routinely scheduled, routine preanesthetic evaluation with education and counseling about multimodal analgesia and postoperative pain expectation-setting may be appropriate
- Patients with untreated depression may benefit from starting antidepressant medication in the perioperative period, and continuing as appropriate in coordination with the patient's primary care clinician or with a behavioral medicine specialist

- Shared decision-making, patient expectations and education

Patients should understand that the goal for acute pain management
is often not the total absence of pain, but rather an acceptable level of pain
that allows the patient to achieve functional goals
strategy based on expected degree and duration of pain

STRATEGY BASED ON EXPECTED DEGREE AND DURATION OF PAIN

- Following evaluation and assessment of risk factors that may predispose a patient to greater-than expected acute pain, a tailored multimodal analgesic plan should be instituted.
- ***For all patients, the analgesic strategy starts with***
- nonpharmacologic techniques,
- non-opioid analgesics,
- local or regional analgesia techniques as appropriate.
- Opioids should be added only as necessary

- Pain trajectories
- The expected degree of pain and time course of resolution varies with both patient factors and the type of surgery or injury.
- For many patients, acute pain peaks at one to three days after injury or surgery, and should be much less by seven days
- ***Basic strategy for all patients***
- For all patients, regardless of the expected degree of pain, perioperative pain management should include :
- nonpharmacologic approaches,
- acetaminophen
- nonsteroidal anti-inflammatory drugs (NSAIDs) unless there are contraindications,
- local or regional anesthesia/analgesia techniques when appropriate

Allina Health Pain Assessment Scale

10	**Worst Pain You Can Imagine**
7-9	**Severe Pain** **Pain keeps you from doing your regular activities.** ⑨ Pain is so bad that you can't do any of your regular activities, including talking or sleeping. ⑧ Pain is so intense that you have trouble talking. ⑦ Pain distracts you and limits your ability to sleep.
4-6	**Moderate Pain** **Pain may interfere with your regular activities.** ⑥ Pain makes it hard to concentrate. ⑤ You can't ignore the pain but you can still work through some activities. ④ You can ignore the pain at times.
1-3	**Mild Pain** **Pain doesn't interfere with your regular activities.** ③ You may notice the pain but you can tolerate it. ② You may feel some twinges of pain. ① You may barely notice the pain.
0	**No Pain**

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- **Expected mild pain**
- For patients who have mild pain or are expected to have mild postoperative pain, the basic strategy may be sufficient.
- **Expected moderate pain**
- For these patients, in addition to the basic strategy, we add the following:
- If regional block techniques are used, a continuous perineural infusion of local anesthetic may be beneficial if moderate pain is expected to last ≥2 days.
- Opioids may be prescribed in oral and/or intravenous formulations on an as needed basis in the hospit

Expected severe pain

- patients with existing or expected severe pain, we use the basic strategy, and in addition:
- If regional block techniques are used, a continuous perineural infusion of local anesthetic may be beneficial if severe pain is expected to last ≥2 days.
- For some patients, single injection neuraxial opioid or continuous neuraxial analgesia may be needed
- Gabapentinoids, ketamine infusion, and lidocaine infusion may be indicated for selected patients, and can be used concurrently
- Opioids may be prescribed in oral and/or intravenous formulations For patients with constant severe pain,

Choice of analgesic for acute pain [2]		
	Opioids likely required	**Nonopioid analgesics likely as effective as opioids**
Injuries	• Major trauma • Crush injuries • Burns	• Lower back pain • Neck pain • Soft tissue injuries (e.g., sprain, bursitis)
Surgery	• Major surgery	• Minor surgery

Other medical conditions	• Severe pain PLUS
	  ◦ Contraindications to NSAIDs
	  ◦ OR NSAIDs unlikely to be effective
		• Odontalgia
		• Renal colic
		• Headaches (including migraine)

OPTIONS FOR MANAGING POSTOPERATIVE ANALGESIA

- Nonpharmacological therapy
- Psychological therapy
- compression , elevation, cryotherapy (eg, icing), acupuncture, transcutaneous electrical stimulation, and music

PHARMACOLOGICAL MANAGEMENT

- Alter Nerve Conduction (Local Anesthetics)
- Modify Transmission in the Dorsal Horn (Opioids, Antidepressants)

PHARMACOLOGICAL

- **Nonopioid analgesics and adjuncts**
- Acetaminophen and NSAIDs
- Gabapentinoids
- Ketamine
- Intravenous lidocaine
- Glucocorticoids
- Alpha-2-receptor agonists
- Skeletal muscle relaxants

NONOPIOID ANALGESICS AND ADJUNCTS

- ***1-Acetaminophen and NSAIDs***

Administration of acetaminophen with nonselective NSAIDs or celecoxib before surgery for postoperative pain in most patients without contraindications to the drugs

acetaminophen (paracetamol) with NSAID were more effective for postoperative pain after a variety of surgical procedures

NSAIDS

- Good
  - Part of multimodal analgesia
  - Bone pain
  - Opioid sparing
- Bad
  - Gastric
  - Renal
  - Asthma
  - Bleeding
- **GRAB**

2-Gabapentinoids(gabapentin and pregabalin)

- are antiepileptic agents commonly used to treat neuropathic pain

Use of gabapentinoids (gabapentin and pregabalin) as part of multimodal postoperative analgesia has become controversial, and practice varies even amongst UpToDate contributors

the decision to use gabapentinoids must balance the potential improved postoperative analgesia against side effects of sedation, dizziness, and respiratory depression when combined with opioids

3-Ketamine:-

Perioperative administration of low-dose intravenous ketamine has been shown to provide opioid-sparing analgesia and to prevent hyperalgesia

usually administration of ketamine for patients with chronic pain (especially thoseon long term opioid therapy) who are expected to have severe post operativepain, and who have general anesthesia without regional anesthesia techniques

4-Intravenous lidocaine:-

- IV lidocaine can be administered by infusion intraoperatively and/or postoperatively for the management of pain.

use IV lidocaine for some patients as part of a multimodal pain strategy when regional anesthesia techniques are not possible.

Whenever IV lidocaine is administered, the possibility of local anesthetic systemic toxicity should be considered

5-GLUCOCORTICOIDS

Glucocorticoids (most commonly dexamethasone) are usually administered intraoperatively for prevention of PONV or at the request of the surgeon to reduce postoperative edema (eg, during spine or airway surgery), but these medications may also improve pain control since edema, inflammation, and pain are interrelated

6-SKELETAL MUSCLE RELAXANTS:

Non-benzodiazepine skeletal muscle relaxants (eg,cyclobenzaprine, baclofen, tizanidine) may be beneficial for patients with acute pain from postoperative muscle spasm.

Muscle relaxants may be of benefit for other types of acute pain, though evidence is limited

REGIONAL ANESTHESIA TECHNIQUES:-

Whenever possible, local anesthesia, neuraxial analgesia, or peripheral nerve blocks should be used as part of the multimodal regimen for postoperative pain control.

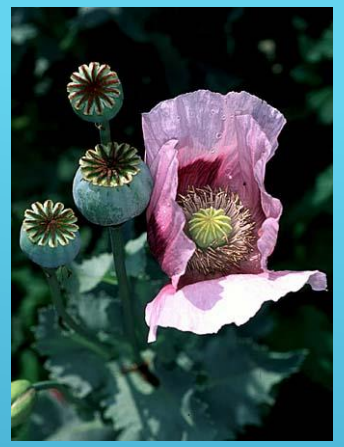
In some cases, a regional analgesic or anesthetic technique will provide adequate pain control without additional systemic medication (eg, brachial plexus block for upper extremity surgery).

In other cases opioids or nonopioid analgesics will be required in addition to one of these modalities.

Wound infiltration

Periarticular infiltration

OPIOID FOR ACUTE PAIN



- Bind to Opioid Receptors :
- Mu, Delta and Kappa
- Morphine, Hydromorphone, Meperidine, Fentanyl, Codeine, Methadone, Oxycodone, Hydrocodone, Tramodol
- Opioids may be Combined with NSAIDs to Enhance the Opioid Analgesic Effect

OPIOID FOR ACUTE PAIN

- Prescribing principles:-

Use immediate-release opioids rather than extended-release or long-acting opioids.

Start at the lowest effective dose.

Prescribe PRN doses rather than scheduled doses.

Limit prescription duration to the expected duration of severe pain.

Reevaluate the risk-benefit ratio if dosage increases are required.

- Oral opioids should be used whenever possible for patients who require opioids after surgery.
- When IV opioids are prescribed for patients who are unable to take oral medications, patient controlled analgesia(PCA) may be indicated if the patient is awake, aware, and capable of pressing the bolus delivery button

PATIENT CONTROLLED ANALGESIA

- Small Doses of Analgesic Drug (Usually Opioids), are Administered (IV) by Patient
- Allows Basal Infusion and Demand Boluses
- Over Dosage is Avoided

  by Limiting the Amount

  and Number of Boluses

  in a Set Period of Time

- **Discontinuing regional anesthesia techniques**:-

Continuous epidural or peripheral nerve blocks are typically used for a few days to a week, and are often discontinued when pain improves and is well controlled with oral analgesics. If there is any question, one option is to discontinue the infusion for several hours before removing the catheter.

SWITCH FROM IV TO ORAL OPIOIDS:-

Patients with severe pain can use IV for several days,

after which they should transition to oral opioids if able to take medications by mouth

REFERENCES

- Uptodate
- Amboss
- Websites
- Sabiston surgery